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(54) Title of the invention: Printing controller, printing system, adapter, printing control method and storage medium

(57) Abstract:

Problem to be solved: To update an irreducible minimum printing control program.

Solution: A network server is connected based on an instruction (S7002 and S7007), identification data for identifying control information corresponding to the instruction are acquired from the connected network server (S7009) and the contents of the identification data and judged (S7010). According to the result of the judgment, the control information corresponding to the instruction is acquired from the network server (S7011), the acquired control information is stored in a rewritable memory (S7015) and the control information is updated (S7016).

[Claims]

[Claim 1] A print control unit including a connecting means connected to a network server based on directions, an identification information acquisition means that acquires identification data for discriminating control information corresponding to these directions from the mentioned above connected network server, a judging means that judges the contents of the mentioned above acquired identification data, a control information acquisition means that acquires control information corresponding to the mentioned above directions from the mentioned above network server according to a result of the mentioned above judgment and an update means that stores in a memory that can rewrite the mentioned above acquired control information and updates control information.

[Claim 2] The print control unit according to claim 1 characterized by that the mentioned above identification data includes version information for judging necessity of renewal of control information.

[Claim 3] The print control unit according to claim 1 or 2 characterized by that the mentioned above judging means compares the mentioned above acquired identification data with identification data of information already stored in the mentioned above memory.

[Claim 4] The print control unit according to claims 1 - 3 characterized by including the version with the mentioned above acquired identification data and identification data of control information already stored

in the mentioned above memory same as a result of the mentioned above judgment or a means to cut connection with the mentioned above network server when old.

[Claim 5] The print control unit according to claims 1 - 4 characterized by acquiring control information from the mentioned above network server, as a result of the mentioned above judgment, the mentioned above control information acquisition means differs in acquired identification data from identification data of control information already stored in a memory or a high version at the time.

[Claim 6] The print control unit according to claims 1 - 5 characterized by including a means to cut connection with the mentioned above network server when stored in a memory that can rewrite the mentioned above acquired control information.

[Claim 7] The print control unit according to claims 1 - 6 characterized by including an interface for connecting a printing means for performing printing according to the mentioned above updated control information.

[Claim 8] The print control unit according to claim 1 or 7 characterized by that a control program for controlling the mentioned above printing means that processes printed information acquired by a network is included in the mentioned above control information.

[Claim 9] A printing system including the print control unit according to claim 1, a means for performing a printing job based on control information updated by the mentioned above print control unit.

[Claim 10] A printing controlling method including a joint process connected to a network server based on directions, an identification information acquisition process of acquiring identification data for discriminating control information corresponding to these directions from the mentioned above connected network server, a determination process that judges the contents of the mentioned above acquired identification data, a control information acquisition process of acquiring control information corresponding to the mentioned above directions from the mentioned above network server according to a result of the mentioned above judgment and an updating process of storing in a memory that can rewrite the mentioned above acquired control information and updating control information.

[Claim 11] The printing controlling method according to claim 10 characterized by that the mentioned above identification data includes version information for judging necessity of renewal of control information.

[Claim 12] The printing controlling method according to claim 10 or 11 characterized by that the mentioned above determination process compares the mentioned above acquired identification data with identification data of information already stored in the mentioned above memory.

[Claim 13] The printing controlling method according to claims 10 - 12 characterized by including the process of cutting connection with the mentioned above network server

the version with the mentioned above acquired identification data and identification data of control information already stored in the mentioned above memory same as a result of the mentioned above judgment or when old.

[Claim 14] The printing controlling method according to claims 10 - 13 characterized by acquiring control information from the mentioned above network server, as a result of the mentioned above judgment, the mentioned above control information acquisition process differs in acquired identification data from identification data of control information already stored in a memory or a high version at the time.

[Claim 15] The printing controlling method according to claims 10 – 14 characterized by including the process of cutting connection with the mentioned above network server, when stored in a memory that can rewrite the mentioned above acquired control information.

[Claim 16] The printing controlling method according to claims 10 - 15 characterized by including a process of carrying out delivery processing for information to a printing means in order to perform printing according to the mentioned above updated control information.

[Claim 17] The printing controlling method according to claim 10 or 16 characterized by that a control program for controlling the mentioned above printing means that processes printed information acquired by a network is included in the mentioned above control information.

[Claim 18] A computer-readable storage that stored a program for performing a printing controlling method characterized by including a code of a joint process that this program connects to a network server based on directions, a code of an identification information acquisition process of acquiring identification data for discriminating control information corresponding to these directions from the mentioned above connected network server, a code of a determination process that judges the contents of the mentioned above acquired identification data, a code of a control information acquisition process of acquiring control information corresponding to the mentioned above directions from the mentioned above network server according to a result of the mentioned above judgment and a code of an updating process of storing in a memory that can rewrite the mentioned above acquired control information and updating control information.

[Claim 19] The storage according to claim 18 characterized by that a code of the mentioned above determination process compares the mentioned above acquired identification data with identification data of information already stored in the mentioned above memory.

[Claim 20] The storage according to claim 18 characterized by that codes of the mentioned above control information acquisition process differ from identification data of control information in which acquired identification data is already stored in a memory as a result of the mentioned above judgment or is characterized by acquiring control information from

the mentioned above network server at the time of a high version.

[Claim 21] The print control unit according to claim 7 characterized by that a printer is included in the mentioned above printing means.

[Claim 22] An adapter including a means that carries out call origination in order to connect with a server, when renewal of a program is carried out, a means to acquire a version of a program from this server after connecting with the mentioned above server, a means to acquire a program from the mentioned above server, to cut the mentioned above connected circuit, when a program of a server is new and it is distinguished based on the mentioned above acquired version, and to cut the mentioned above connected circuit when a program of a server is not new and it is distinguished based on the new acquired mentioned above.

[Claim 23] The adapter according to claim 22 characterized by including a means to change the mentioned above adapter into form that print data from a server based on an E-mail are received, and a printer can receive this received data and to transmit this changed print data to a printer.

[Claim 24] The adapter according to claim 22 characterized by that directions of renewal of the mentioned above program include directions by a user.

[Detailed description of the invention]

[0001]

[Field of the invention] The printing system that includes the print control unit connected to a printer, an adapter, its print control unit and the like while this invention is connected to a server by a communication line, it is especially related with the program update method of this print control unit about the storage that stored the program that performs a printing controlling method applied to the print control unit and a printing controlling method for the same.

[0002] Here, a print control unit receives an E-mail, an attached file and the like that portable communication terminals, such as a cellular phone and PDA, received by a communications network, for example, and carries out the printout of those data in a printer.

[0003]

[Description of the prior art] Conventionally, an e-mail service and network print service are completely different services, and it was not interlocked. In particular the cellular phone or PDA (Personal Digital Assistants) with an electronic mail function do not have a print function, when it was going to print an E-mail to leave record, the E-mail had to be forwarded to the mail address that makes PC (Personal Computer) the client, and it had to print with the printer connected to PC. Thus, in the case of an electronic mail user only with a cellular phone or PDA, there was no means to print the received E-mail.

[0004] Although a file can be attached to an E-mail, it is required for opening this file to execute an application program on PC. Thus, in the case of the electronic mail user using a cellular phone without the function to execute an application program, PDA and the like, there was no means to refer to the received attached file.

[0005] As mentioned above, even if the electronic mail user using a cellular phone PDA and the like without a print function, receives an E-mail to leave record, it cannot print. There was a problem that the electronic mail user using the cellular phone PDA and the like that cannot execute an application program, could not refer to the contents or additional information of a file that were attached to the E-mail.

[0006] Next, the application server changed into print data in light of the mentioned above problems, the printer adapter that receives print data by a communications network and changes the received print data into the data format of the interface of a printer from an application server, the printing system that includes a printer that prints the print data sent from the printer adapter is proposed by these people.

[0007] In this printing system, the electronic mail user using a cellular phone PDA, and the like without a print function, specifies and transmits a printer to the application server that has registered the E-mail to leave record as a user preliminary. The application server that received this E-mail changes the received printing content into the print data suitable for the specified printer.

And an application server transmits print data to the printer adapter of the specified printer using a communications network. A printer adapter performs protocol conversion to the sent print data and the specified printer prints out.

[0008] A plurality of application programs for opening an attached file preliminary are installed in the application server. The electronic mail user using a cellular phone , PDA, and the like without the function to open an attached file specifies and transmits a printer to it while directing attached file printing to the application server that has registered preliminary the E-mail with which the file with the contents to know is attached. The application server that received this E-mail starts the application program corresponding to the attached file and opens an attached file. An application server changes the open contents of the attached file into the print data suitable for the specified printer. And an application server transmits print data to the printer adapter of the specified printer using a communications network. A printer adapter performs protocol conversion to the sent print data and the specified printer prints out.

[0009] One model after another with new communication equipment for a short period of time linked to a printer adapter, such as a cellular phone and PHS, is supplied to a commercial scene. While a printer adapter with it is called for, the function that can be connected also to new communication equipment by upgrading the program of a printer adapter to timely is

needed. The following devices are made to upgrade a program with small shape and low cost

[0010] When the information about a program is exchanged and predetermined conditions are fulfilled by JP 7-191854 A by the wording of a telegram that requires download, processing that receives a program is performed.

[0011] In JP 10-21060 A, whenever the application program of a terminal unit (personal computer) is started, the newest version is required of a processing unit by a communication line, when the version of the program of a processing unit is newer than the version of a self program, processing that updates a self program automatically, so that it may become the newest program is performed.

[0012] If JP 11-65827 A requires the version information of the current program set as the personal digital assistant and the version information of a current program is received from a personal digital assistant, it compares with the version information stored by the terminal program store means. If the disagreement of both version information is checked by this comparison means, the newest program stored by the terminal program store means will be downloaded.

[0013]

[Problems to be solved by the invention] However, it cannot be adapted for the adapter by which the printer adapter with it is called for in the mentioned above device or what has good user-friendliness cannot be realized.

Operation of the mentioned above printer adapter is simple, and small size and low cost is achieved.

[0014] That is, in order to mount the function to require download by wording of a telegram, between a server and a printer adapter, it is necessary to mount a special protocol in both sides. Thus, there was a problem that mounting a protocol in a simple printer adapter becoming complicated too much.

[0015] In the method of requiring the newest version of a processing unit by a communication line whenever an application program is started. Since update of a program is performed automatically whenever an application program is started, there is a problem that the communication charges besides the purpose called download of the program to a user's printing demand certainly generate.

[0016] The version information of the current program set as the personal digital assistant is required, in the method of comparing with the version information stored by the terminal program store means, if the version information of a current program is received from a personal digital assistant, there is problem as which management and the comparison means of a program are required of a server.

[0017]

[Means for solving the problem] This invention is made in view of such a problem, and raises operability, and it aims at providing a print control unit, a printing system, a printing controlling method, and an update method of a program of a storage that made it possible to reduce

useless fee collection. This invention is characterized by a print control unit including the following, in order to attain this purpose a connecting means connected to a network server based on directions, an identification information acquisition means that acquires identification data for discriminating control information corresponding to these directions from the mentioned above connected network server, a judging means that judges the contents of the mentioned above acquired identification data, a control information acquisition means that acquires control information corresponding to the mentioned above directions from the mentioned above network server according to a result of the mentioned above judgment, and an update means that stores in a memory that can rewrite the mentioned above acquired control information and updates control information.

[0018] This invention is characterized by a printing system including the mentioned above print control unit, a means for performing a printing job based on control information updated by the mentioned above print control unit.

[0019] This invention is characterized by a printing controlling method including the following, in order to discriminate control information corresponding to these directions from a joint process linked to a network server, and the mentioned above connected network server based on directions, an identification information acquisition process of acquiring identification data, a determination process that judges the contents of the mentioned above acquired identification data, a control

information acquisition process of acquiring control information corresponding to the mentioned above directions from the mentioned above network server according to a result of the mentioned above judgment, an updating process of storing in a memory that can rewrite the mentioned above acquired control information and updating control information.

[0020] This invention is characterized by that a computer-readable storage that stored a program for performing the mentioned above printing controlling method according to this invention includes a code of a joint process that this program connects to a network server based on directions, a code of an identification information acquisition process of acquiring identification data for discriminating control information corresponding to these directions from the mentioned above connected network server, a code of a determination process that judges the contents of the mentioned above acquired identification data, a code of a control information acquisition process of acquiring control information corresponding to the mentioned above directions from the mentioned above network server according to a result of the mentioned above judgment, and a code of an updating process of storing in a memory that can rewrite the mentioned above acquired control information and updating control information.

[0021] This invention is characterized by an adapter including the following, in order to connect with a server, when renewal of a program is carried out, a means that carries out call origination, a means to

acquire a version of a program from this server after connecting with the mentioned above server, a means to acquire a program from the mentioned above server, to cut the mentioned above connected circuit, when a program of a server was new and it is distinguished based on the mentioned above acquired version and to cut the mentioned above connected circuit when a program of a server was not new and it is distinguished based on the mentioned above acquired new.

[0022]

[Embodiment of the invention] Next, an embodiment of the invention is described with reference to drawings.

[0023] (The 1st embodiment) Drawing 1 is a system configuration drawing showing the 1st embodiment of this invention.

[0024] The terminal (PDA is called) 101, dial-up line that this system can transmit and receive an E-mail and can display the contents, the communication line networks 103 (in this embodiment, it is considered as the public network having included the wireless circuit network), such as ISDN and a satellite communication network, the communication line network 103 and PDA 101. The adapter 108 connected to the external provider 104 that mediates between the Internet 106 and the communication line networks 103 that are the portable communication terminal 102 and the logical space to connect, the printer 109 that is printers, and the printer 109, and the communication line network 103 and the adapter 108. It includes the application server 105 that communicates with the protocol preliminary decided to

be the portable communication terminal 107 to connect and the printer 109.

[0025] The external provider 104 performs management of the mail account of PDA 101. The external provider 104 can communicate with PDA 101 with the protocol decided preliminary and can transmit and receive mail data by control of PDA 101.

[0026] Management management of various characteristic data, such as a kind of the application server 105, the mail account relevant to each of a plurality of printers, a telephone number and printer is carried out. Transmission and reception of mail between PDA and the like to which the application server 105 passed the communications network 103 or the Internet 106, selection of the various services (acquisition, printing and the like of the address specified by deployment and printing / attachment URL of printing and the attached file of a mail text) according to the judgment of the contents of e-mail that is received and a decision result, the candidate for printing is changed into the information suitable for the specified printer (for example, 109), connection (an Internet connectivity, the call origination of the telephone to the communications network 103 and the arrival from the communications network 103 by a state) with the adapter 108, attestation, exchange of print data, the adapter 108, processing of an error of the printer 109 and the like are performed. Control of whether the demand that transmits printing data to the adapter 108 is advanced or to stand by the call origination from the adapter 108 is performed too.

[0027] The application server 105 exchanges and controls internal adjustment information, an updated program and the like of the adapter 108 between the adapters 105.

[0028] Recognition of the error condition of the printer 109 according to the adapter 108 judgment of the connection printer 109 and an interface with the printer 109, the notice to the application server 105 of status, such as status of the printer 109, and a communicating state, control of the portable communication terminal 107, the call origination to the application server 105 according to operation by a user, attestation with the arrival from the application server 105 and the automatic call origination and the application server 105 according to the directions, transmitting processing to the printer 109 of the receiving print data according to a predetermined protocol and the like are performed.

[0029] Also, the adapter 108 performs acquiring internal adjustment information, the updated program and the like from the application server 105.

[0030] In the mentioned above composition, PDA 101 explains the procedure in the case of transmitting the contents of the acquired mail to the application server 105.

[0031] A user specifies the mail address of the application server 105 relevant to application (mail text printing) to perform. Setting out which transmits a mail text to print to the specified address is performed, and a SEND statement is inputted. PDA 101 that received the SEND statement controls the portable communication

terminal 102, and connects with the external provider 104 through the communication line network 103. And according to the protocol decided preliminary, PDA 101 transmits mail data, and after it carries out required data exchange, it cuts a circuit.

[0032] On the other hand, if the application server 105 scans the reception BOX of account (periodically check) and the data for printing is received, it will process mail text printing by the given order.

[0033] Next, the inside of each component part of the system shown on drawing 1 is explained in details.

[0034] Drawing 2 is a drawing showing the internal configuration of the application server 105 shown on drawing 1.

[0035] 3101 is a firewall server and has functions, such as invasion from the outside, and interception of an attack. It is used in order to employ safely the server group on the intranet in the application server 105.

[0036] 3102 is a switch and is because the intranet in the application server 105 is constituted.

[0037] 3103 is a communication server, supports connection by PIAFS, an analog modem and ISDN, and has a firewall and a RADIUS client function.

[0038] 3104 is a network print server, is concerned with network print service and performs creation of the print data according to the purpose, print job generation, communication with the adapter 108 and the like

[0039] 3105 is a RADIUS server about the RADIUS system that supports the dialup connected user authentication system of an industry standard.

The RADIUS server 3105 receives the authentication demand from the communication server 3103 with a RADIUS client function and serves to return the propriety of attestation to a client.

[0040] 3106 is a mail server and receives printing request mail.

[0041] 3107 is a WWW server and has a homepage of network print service. A user homepage is provided for every user and each user enables it to use print service using CGI and the like.

[0042] 3109 is the Internet and 3108 is a public network (PSTN or PHS network).

[0043] 3110 is a FTP server and manages internal adjustment information, an updated program and the like of the adapter 108. Internal adjustment information, the updated program and the like are transmitted as a file with a file transfer protocol from the adapter 105 with a user's directions.

[0044] Next, the e-mail print function of the application server 105 constituted like drawing 2 is explained.

[0045] The user of network print service acquires the e-mail account of the mail server 3106 in the application server 105, before receiving service of E-mail printing. By sending an E-mail to this account, the user can receive E-mail print service.

[0046] Different account for every service that provides the mentioned above e-mail account to one user is prepared. As 4 kinds of following services to provide, 4 kinds also of the mentioned above e-mail accounts are prepared to each user, respectively.

- [0047] 1. electronic mail body printing
- 2. attached file printing
- 3. text + attached file printing
- 4. URL printing

By transmitting an E-mail to the mail account prepared for electronic mail body printing. The user of network print service will request print data generation of only an electronic mail body to the application server 105.

[0048] By transmitting an E-mail to the mail account prepared for attached file printing, the user of network print service will request print data generation of the attached file of an E-mail to the application server 105.

[0049] By transmitting an E-mail to the mail account prepared for this + attached file printing, the user of network print service will request print data generation of an electronic mail body and an attached file to the application server 105.

[0050] By transmitting an E-mail to the mail account prepared for URL printing, the user of network print service, acquisition and generation of print data of the information described by HTML in URL described in the electronic mail body to the application server 105, XML, and the like will be requested.

[0051] Although there is no URL description in an electronic mail body although there is no attached file when an E-mail is transmitted to the mail account for printing this or when an E-mail is transmitted to the mail account for printing the print data concerning this, the print data of only an electronic mail body are generated.

[0052] When mail of only an attached file is transmitted to the mail account prepared for this printing, the print data of an attached file are generated.

[0053] When the E-mail which has only URL description in the text is transmitted to the mail account prepared for this printing, the print data of the information described by HTML in URL, XML, and the like instead of the electronic mail body are generated.

[0054] In spite of having transmitted the electronic mail body URL was described to be to the mail account prepared for URL printing, when the mistake in acquisition failure of the information described by HTML, XML, and the like and URL description, and the like occur, e-mail informs a user by PDA 101 from the application server 105 having been an error.

[0055] The grant method of the mail account in this system, only a user account is considered as user account + «C» user account + «B» and for URL printing user account + «A» and for this + attached file printing to attached file printing for this printing. These are registered into the database of the application server 105. When registering and an E-mail is transmitted to those addresses, the telephone number of the portable communication terminal (107) connected to the printer (109) used for printing is also registered into the database of the RADIUS server 3105. The machine kind information of a printer (109) may be registered into the database of the RADIUS server 3105.

[0056] For example, the domain name of the mail server 3106 should be set to mnp.co.jp, and the user should acquire account called tama. The mail server 3106 prepares the following automatically as an e-mail account then.

[0057]

1. tama@mnp.co.jp (for this printing)
2. tamaA@mnp.co.jp (for attached file printing)
3. tamaB@mnp.co.jp (for this + attached file printing)
4. tamaC@mnp.co.jp (for URL printing)

Thus, the user who has account called tama since four print functions and the address of an E-mail correspond, even if it does not do what inputs a print command into the personal digital assistant 102 by the easy operation that chooses either of four e-mail addresses registered preliminary, the selection setting of the desired print function can be carried out.

[0058] Drawing 3 is a software module line-block diagram in the application server 105.

[0059] Mail Server3202 exists in the mail server 3106 physically. It has an IMAP server function and the interpretation of multi-part MIME and the notice to the IMAP client (in the case of this embodiment E-mail object 3203) of e-mail arrival are performed.

[0060] The E-mail object 3203 has the data and user ID (in this case, e-mail address) used as a printing object. It can have an IMAP client function and each part can be taken out from an IMAP server (case emailManager3202 of this embodiment) also by mail like multi-part MIME according to a MIME type.

It has the function to pass printing target data to the PrinterManager object 3205 too.

[0061] PrinterDB3204 stores each user's information and provides PrinterManager3205, UserHTMLPage3209, HTMLPage3210 and the like with a database accessing means. There is the following as each user's information.

[0062] UserID (user name at the time of network print system registration)

UserPassword (password of the user at the time of network print system registration)

UserTelNumber (telephone number of the user at the time of network print system registration)

AdapterID (ID peculiar to an adapter)

AdapterTelNumber (number of the telephone connected to an adapter)

PrinterID (printer model ID acquired by IEEE 1284)

These are set up for every user at the time of network print system registration.

[0063] The PrinterManager object 3205, it has ID of the PrinterDriver object 3206 and it is a controlling function (such as elimination, a count, and a stop) of the PrinterDriver object 3206. The functions to use user ID (in this case, e-mail address) as a key, and to search PrinterDB3204, a suitable PrinterDriver object is generated if needed from PrinterID acquired from PrinterDB3204, and it has the function to pass printing target data and the like. Generation of a PrinterDriver object is choosing and starting the printer driver corresponding to a printer.

[0064] The PrinterDriver object 3206 is generated for every printer according to PrinterID. The PrinterManager object 3205 holds AdapterTelNumber, AdapterID, and PrinterID according to the user ID acquired from PrinterDB3204, and changes printing target data into the form that it can understand a specific printer. In attached file printing, the application corresponding judging from the MIME type the application type to it is started and changed.

[0065] The PrintJob object 3207 is generated every PrinterDriver object 3206. AdapterTelNumber, AdapterID, PrinterID according to user ID acquired to the generate time the print data that the PrinterDriver object 3206 generated are held, and it has a function that carries out queuing of the print data, and a function outputted to the adapter 108 based on AdapterTelNumber.

[0066] The WebBrowser object 3208 has a browsing function of WWW. By the HTML acquisition message from the PrinterDriver object 3206, the information created in HTML is acquired from specification URL, and it has a function that carries out a rendering.

[0067] The UserHTMLPage object 3209 is WebPage generated for every user, and has User Information of a default printer and the like. Reflection of the print status using CGI, print job control by sending a job control message to the PrinterDriver object 3206, it has functions, such as change and the like of the user set by reflecting in PrinterDB3204 the data received by HTTP.

Also, it has a function in which this network print system user's homepage is made to reflect print status by the request from the PrinterManager object 3205.

[0068] HTMLPage3210 is a homepage of the domain that constitutes this network print system. It has functions, such as user registration.

[0069] RADIUSServer3211 is equivalent to the radius server 3105 of drawing 2.

[0070] PortMaster3212 is equivalent to the communication server 3103 of drawing 2.

[0071] PDA 3201 is a communication terminal that is equivalent to PDA 101 of drawing 1 and has a transmitting mail function at least. It may have a browsing function of HTML.

[0072] Adapter 3213 is equivalent to the adapter 108 of drawing 1.

[0073] Printer3214 is equivalent to the printer 109 of drawing 1.

[0074] Although PDA 3201 and Adapter 3213 are physically connected to this network print system by communication terminals, such as PHS, the graphic display of the communication terminal is omitted.

[0075] FileTransferManager 3220 is equivalent to FTP server 3110 of drawing 2.

[0076] A flow until the application server 105 receives an E-mail, generates a print job and next transmits to the adapter 108 with reference to drawing 3 is explained below.

[0077] The user of network print service transmits an E-mail to print to the application server 105 using the mail terminal apparatus of PDA 3201. As the address of the E-mail was mentioned above, the address corresponding to giving is chosen that a user wishes.

[0078] MailServer3202 receives actually the E-mail transmitted to the application server 105.

MailServer3202 of this embodiment, including a function of an IMAP server, MailServer3202 notifies e-mail reception there according to an IMAP protocol to the E-mail object 3203 in the network print server 3104 for every user that has an IMAP client function.

[0079] The E-mail object 3203 in the network print server 3104 acquires the MIME part of the purpose that responded to the mail address with an IMAP protocol. The acquired data is transmitted to the PrinterManager object 3205.

[0080] The PrinterManager object 3205 searches PrinterDB3204 using the user ID shown by an e-mail account, and acquires a user's information, including ID and the like of the printer used by default. And the PrinterDriver object 3206 to the printer of the acquired default use is generated.

[0081] The PrinterDriver object 3206 acquires the data that should be printed from the PrinterManager object 3205, changes it into print data, and generates the PrintJob object 3207.

[0082] If the data that should be printed is URL, the PrinterDriver object 3206 will transmit URL to the WebBrowser object 3208.

The WebBrowser object 3208 acquires the contents (homepage described by HTML, XML, and the like) of specified URL from the Internet, and after it carries out the rendering of it, it returns them to the PrinterDriver object 3206. The PrinterDriver object 3206 changes into print data the data by which the rendering was carried out and that should be printed and generates the PrintJob object 3207.

[0083] When acquisition of the contents of URL, such as timeout by the bad communicating state and an address mistake, goes wrong, the WebBrowser object 3208 returns an error to the PrinterDriver object 3206. The PrinterDriver object 3206 notifies an error to the PrinterManager object 3205, creates mail of the purport that the E-mail object 3203 is an error and returns it to a user.

[0084] Next, the print data stored into the PrintJob object 3206 are transmitted to the adapter 108.

[0085] By the way, 2 kinds, the case where the application server 105 carries out call origination of this transmission, and performs it, and when carrying out by the adapter 108 carrying out call origination, are possible.

[0086] When the adapter 108 carries out call origination, the adapter 108 (=3213) logs in to the application server 105. In this case, Adapter 3213 telephones PortMaster3212 and logs in as a key of attestation of AdapterID, AdapterTelNumber, and PrinterID. The key of attestation is sent to PrinterDB3204 by PortMaster3212 to

RADIUSServer3211, and is checked by PrinterDB3204. Although this login connection is TCP/IP connection, the IP address given to Adapter 3213 by PortMaster3212 is a private address of this network print system.

[0087] Adapter 3213 to which login was permitted in the mentioned above process sends the request message of print data to the PrinterManager object 3205.

[0088] The PrintManager object 3205 that received the message, the PrintJob object 3207 corresponding to AdapterID of Adapter 3213, AdapterTelNumber, and PrinterID is specified, and the message of data transmission is sent to the object. The IP address of Adapter 3213 is included in this message.

[0089] The PrintJob object 3207 sends out printing data with an LPR protocol and the like to the specified IP address, that is, the address of Adapter 3213.

[0090] On the other hand, when the application server 108 carries out call origination, PortMaster3212 is requested to carry out call origination to PrinterTelNumber that PrintJob object 3207 self has.

[0091] Although it telephones PortMaster3212 to the mentioned above PrinterTelNumber by the request from the PrintJob object 3207, it notifies the telephone number of this network print system at this time, and once cuts communication. Thus, the adapter 108 acquires the telephone number of a network print system, and applies it to the acquired telephone number again. It is the same operation as the call origination from the adapter 108 after this.

[0092] 4 mail addresses mentioned above and the telephone number of the personal digital assistant connected to the printer by the adapter match, register with the database, and an application server is carried out based on the address of the received mail, a corresponding telephone number is recognized, print data are created, and it can transmit to an adapter by a personal digital assistant by a public communication network.

[0093] If the print job in the PrintJob object 3207 is taken into consideration also when there is only one sheet of paper in Printer3214 (in the case of the printer of the type to which it feeds paper one sheet at a time by manual bypass), it may generate print data per page. In this case, the type of a printer is judged based on PrinterID (device kind information), and the unit of a print job is determined. For example, to a cassette feeding type printer, a plurality of pages data is sent as 1JOB, and a plurality of pages data is sent as a plurality of JOB to a manual bypass type printer. By processing in this way, retransmission of message of the data of the page that an error and jam generated can be performed simply, and it becomes easy to perform processing to error recovery or jam recovery.

[0094] An error of those without paper, and the like may be notified from Adapter 3213 during the printing data transmission between the PrintJob object 3207 and Adapter 3213. In this case, the PrintManager object 3205 receives the error notification from Adapter 3213, and a print data transmission stop message is sent to the PrinterDriver object 3206.

Thus, the transmission to Adapter 3213 from the PrintJob object 3207 of print data can be stopped.

[0095] Also, the PrinterDriver object 3206 can be requested to notify a user of error generation mail at the E-mail object 3203 in that case.

[0096] The UserHTMLPage object 3209 can be requested and reflection of the print status that includes an error in a user's homepage in a network print system can be requested too.

[0097] A flow until the application server 105 next transmits the program that user set file or was updated to the adapter 108 is explained below.

[0098] The adapter 108 (=3213) logs in to the application server 105 with a user's directions. In this case, Adapter 3213 telephones PortMaster3212 and logs in without AdapterID and a password. Although this login connection is TCP/IP connection, the IP address given to Adapter 3213 by PortMaster3212 is a private address of this network print system.

[0099] Adapter 3213 an IP address, the address set up within Adapter 3213 is used and it connects with FileTransferManager 3220 as an adapter ID that is stored in Anonymous in a User name and stored in the adapter information field in password.

[0100] Adapter 3213 to which login was permitted in the mentioned above process sends the request message of a file transfer to FileTransferManager 3220.

[0101] FileTransferManager 3220 manages the following files.

[0102] (1) Version.inf (version file required for program update)

(2) program.bin (update program file for Adapter 3213)

(3) AdapterID.cfg (the configuration file name / User Information file name of an adapter)

AdapterID.cfg has an AdapterID number of files that are the attribute of cfg that was attached and are registered into AdapterID registered by PrinterDB3204.

[0103] FileTransferManager 3220 that received the message sends out the file specified with the file transfer protocol and the like to the specified IP address, that is, the address of Adapter 3213.

[0104] Next, the adapter 108 concerning the embodiment of this invention is explained in details.

[0105] Drawing 4 is a block diagram showing the electric constitution of the adapter 108.

[0106] It connects with the portable communication terminal 107 by the communication terminal interface 2101, and the communication terminal interface 2101 connects the adapter 108 in this embodiment to the internal bus 2108. When this communication terminal interface 2101 connects a different communication terminal, it absorbs a difference of an electrical property and connects it to the internal bus 2108.

[0107] That is, the adapter 108 is for changing the protocol of the communication interface of PHS and the like into protocols, such as a Centronics interface of the printer 109.

[0108] The printer 109 is connected to the internal bus 2108 of the adapter 108 by the printer interface 2104. In this embodiment, the adapter 108 and the printer 109 are connected with an IEEE 1284 interface.

[0109] The operation from RAM 2106 and a user that makes the memory of the microcomputer 2102 that controls whole operation, ROM 2105 that store a setting detail while storing an internal operation program, a program execution field and transmitted and received data the internal bus 2108, U/I 2103 that is a user interface that performs a display to a user is connected.

[0110] U/I 2103 is equipped with switch SW(1) 2112 that controls a power supply, and SW(2) 2110, SW(3) 2111 that perform control to the portable communication terminal 107 or the printer 109. 3 color LED (1) 2114 and LED(2) 2115 notify a user of the state of the adapter 108.

[0111] ROM 2105 is rewritable ROM and the current update of software is possible for it. The addition of a new protocol in that case is possible too.

[0112] The external-interface part currently prepared for the portable communication terminal 107 controls dispatch between the communications networks 103 by the adapter 108, arrival, cutting and the like by the interface 2101 from the exterior. And the microcomputer 2102 controls dispatch, arrival, cutting and the like to the portable communication terminal 107 by the interface 2101. The portable communication terminal 107 outputs a self telephone number and the data of the incoming information (the RING

information, the mail arrival telephone number, the status of the portable communication terminal 107) and Japanese Federation of Printing Industry Workers' Unions of a telephone to the interface 2101. Thus, the adapter 108 can acquire varieties of information, such as a telephone number of the communication terminal 107.

[0113] Both the application server 105 and the portable communication terminal 107 are connected to the communications network 103. When the portable communication terminal 107 is a communication terminal of radio system, it is connected to the communications network 103 by a radio base.

[0114] The adapter 108 performs processing that carries out call origination to the portable communication terminal 107 by the interface 2101 at the telephone number of the communication terminal by the side of the application server 105. The portable communication terminal 107 tries connection by the mentioned above telephone number to the communications network 103. Establishment of connection here follows the method of the communications network 103.

[0115] If the communication terminal by the side of the application server 105 receives the call origination from the portable communication terminal 107, connection with the communications network 103 will be completed.

[0116] ROM 2105 downloads new software by the interface 2101 or the interface 2104, and rewrites an inner program.

A telephone number required for connection, an adapter ID, and the like are stored in ROM 2105 and it can change into it similarly.

[0117] The microcomputer 2102 has the performance that realizes a modem and a protocol with software.

[0118] The power supply 2107 is a power supply that operates the adapter 108.

[0119] Drawing 5 is a drawing showing the composition of the software mounted in the adapter 108.

[0120] In the adapter 108 by the side of drawing, the communication carrier protocol 2207 that establishes connection with a communication terminal is mounted in the higher rank of H/W2208 physically connected with the portable communication terminal 107. Since it is actually connected to the communications network 103 by the portable communication terminal 107, the communication carrier protocol 2207 mainly controls the call origination, arrival, cutting, and the like linked to the communications network 103.

[0121] The TCP/IP protocol suite 2206 is mounted in the higher rank of the communication carrier protocol 2207. In this example, they are PPP, TCP/IP, FTP, and the like. The application 2205 takes charge of adapter function control, such as the adapter 108, an application protocol between the application servers 105, initialization, and IEEE 1284 control, and communicates to a communications network by the TCP/IP protocol suite 2206.

[0122] In the adapter 108, since the communication carrier protocol 2207, the TCP/IP protocol suite 2206, and application 2205 are mounted by software, many functions of the adapter 108 are realized by the microcomputer 2102 of drawing 4, ROM 2105, and RAM 2106.

[0123] Next, operation of such an adapter 108 is explained with reference to drawing 6, drawing 9, drawing 10 and drawing 13.

[0124] Drawing 6 is a drawing showing the change state of the adapter 108. Drawing 9 is a flow chart that shows the procedure of the processing relevant to initialization of the adapter 108. Drawing 10 is a flow chart that shows the procedure of the processing relevant to the call origination of the adapter 108. Drawing 13 is a drawing showing the LED state of the adapter 108.

[0125] The change state of the adapter 108 begins from OFF state 5000 (5000 of drawing 6). SW (1) 2112 that is an electric power switch, if one it will go into power turn self-test mode (5001 of drawing 6). Here, the system check (S6001 of drawing 9) that performs the following the (1) - (4) adapter 108 and the check of a register is performed.

[0126] (1) The checksum check of ROM 2105 (S6003 of drawing 9)

The checksum is written in the field where the control program of the adapter 108 on ROM 2105 is written in, and the adapter information field (drawing 7) that manages the characteristic data of the adapter 108 separate preliminary, respectively, and it is checked

whether these checksums can be read correctly.

Drawing 7 is a drawing showing the composition of the adapter information field on ROM 2105.

[0127] (2) The capacity check of RAM 2106 (S6006 of drawing 9)

Capacity is checked by data writing and a read-out check to RAM 2106 mounted in the adapter 108. The null clearance of all the fields is carried out after a capacity check. The capacity checked is saved RAM 2106 and it uses for the buffer overflow check at the time of print data reception.

[0128] (3) The connection confirmation of the communication terminal 107 (S6008 of drawing 9)

The communication terminal 107 is connected correctly and it is checked whether it is operating. At this time, the telephone number of the communication terminal 107 is acquired and it saves RAM 2106.

[0129] (4) The connection confirmation of the printer 109 (S6010 of drawing 9)

The printer 109 is connected correctly and it is checked whether it is operating. At this time, printer ID is acquired from the printer 109 by the negotiation of IEEE 1284 of the interface 2104. Printer ID of the printer 109 is acquired and it saves RAM 2106.

[0130] When an error is discovered by the above self-test (S6002 of drawing 9, S6005, S6007, S6009, S6011), it goes into the waiting mode for power OFF (5002 of drawing 6), CPU 2102 is made into a standby mode, and it changes into the state in which only the

power OFF by SW(1) 2112 is possible (S6004 of drawing 9).

[0131] In order for the adapter 108 to work, it is necessary to write User Information in the User Information field (drawing 8) on ROM 2105. Drawing 8 is a drawing showing the composition of the User Information field on ROM 2105.

[0132] The User Information field (drawing 8) on ROM 2105 is checked (S6012 of drawing 9), and if it is in the state where User Information is not written in, it will go into the initialization mode (5003 of drawing 6). When User Information on the application server 105 is changed, in order to rewrite User Information on the adapter 108, one SW(1) 2112 also goes into the initialization mode (5003 of drawing 6), pushing SW(2) 2110.

[0133] Since User Information is prepared for the application server 105, in the initialization mode (5003 of drawing 6), it downloads the information in the following procedures and writes it in the User Information field (drawing 8) on ROM 2105.

[0134] (1) If SW (2) 2110 is pushed, call origination will be carried out to the registration center number stored in the adapter information field (drawing 7). If it connects with a registration center, the adapter ID (AdapterID) stored in the adapter information field (drawing 7) is logged in without LoginID and Password by PPP.

[0135] (2) Download the User Information file by FTP.

[0136] The adapter ID (AdapterID) stored in the adapter information field (drawing 7) and a registered password are connected with the FTP server (not represented) that is in the application server 105 as UserID and Password.

[0137] When it succeeds in connection, the User Information file is gained and it stores in the User Information field (drawing 8) on ROM 2105.

[0138] The telephone number for telephoning servers other than a default telephone number is included in the user information file. In change of the telephone number to connect, a user notifies change of a telephone number to the application server 105 by E-mail preliminary with the communication terminal 102, and the notified application server 105 is realized by including the telephone number linked to the User Information file. By matching the address and telephone number of the E-mail preliminary, when a user transmits an E-mail to the address corresponding to the telephone number considered as a request, it may be realized.

[0139] (3) If download of a User Information file is completed, FTP connection closed, logged out and a circuit is cut

[0140] If initial setting is completed when a power turn self-test is successful and User Information is written in correctly and, it goes into the idle mode (5004 of drawing 6) that is in the receipt from the application server 105 or the state that is waiting for a user's operation of SW(2) 2110 or program update mode (5030 of drawing 6).

[0141] Program update mode (5030 of drawing 6) enters by one electric power switch SW1, pushing SW2 and SW3 both. In the mode, LED1 and LED2 carry out red blink simultaneously. In this mode, the newest program module currently prepared for the server can be downloaded and the program on a flash ROM can be rewritten. For details, it is explained below using drawing 11.

[0142] In the system of this embodiment, if preparation of print data is completed by the application server 105. There are 2 operational modes, the operational mode that calls the adapter 108 from the application server 105 side, and the operational mode to which the application server 105 sends out print data by the request from the adapter 108. Receipt check mode (5006 of drawing 6) corresponds to the operational mode that calls the adapter 108 from the application server 105 side.

[0143] In an idle mode (5004 of drawing 6), when the receipt of a telephone is received (S6020 of drawing 10), it moves to receipt check mode (5006 of drawing 6). At Step S6021 of drawing 10, the sender number by the notice of a sender number is obtained. When the sender number is not notified, (S6022 of drawing 10) and receipt are disregarded, and nothing carries out them, but it returns to an idle mode (5004 of drawing 6). On the other hand, when a sender number is able to be acquired (S6022 of drawing 10), the acquired sender number is compared with the server list of number stored in the User Information field (drawing 8) (S6023 of drawing 10).

If there is no acquisition sender number in a server list of number, it will return to the idle mode 5004, without disregarding receipt and carrying out any. If there is a number that is in agreement with the acquired sender number, it will move from RING that is completed to waiting and call origination mode (5005 of drawing 6) (S6026 of drawing 10).

[0144] When a receipt check is successful or when the pushing of SW(2) 2110 detects 1 or less second in an idle mode (5004 of drawing 6) (S6024 of drawing 10), it changes in server call origination mode (5005 of drawing 6) (S6026).

[0145] In server call origination mode (5005 of drawing 6), it has set up so that it can return to an idle state by operation of button SW(3) 2111. In server call origination mode, call origination is carried out using the default access point number registered into the User Information field (drawing 8) (S6026 of drawing 10).

[0146] When the pushing of SW(2) 2110 is 1 seconds or more in an idle mode (5004 of drawing 6), it becomes the mode that a user dials and call origination is carried out by a manual dial (S6028 of drawing 10).

[0147] In Step S6029 of drawing 10, if it connects with the application server 105, the adapter ID (AdapterID) stored in the adapter information field (drawing 7) is logged in without LoginID and Password to the application server 105 by PPP.

[0148] When call origination, connection, and login go wrong, it goes into (S6030) and call origination retry mode (5007 of drawing 6), and it retries according to

communicative regulation. When retry time is exceeded, it returns to an idle mode (5004 of drawing 6). When SW(3) 2111 are pushed during a retry, a retry is canceled and it returns to an idle mode (5004 of drawing 6). The arrival under retry is disregarded.

[0149] If it is judged that it succeeded in login at Step S6030 of drawing 10, at Step S6031, the transmitter telephone number (AdapterTelNumber) gained at the time of the power turn self-test explained above is set to UserID, printer ID (PrinterID) is set to password, and it connects with a print data call forwarding service. When connection goes wrong, it considers that (S6032 of drawing 10) and print data cannot be prepared, and logs out of the application server 105, and a circuit is cut, and it returns to an idle mode (5004 of drawing 6). On the other hand, if it connects with a print data call forwarding service (it is YES at S6032 of drawing 10), going into data receiving mode (5008 of drawing 6), and receiving print data from the application server 105, the receive buffer on RAM 2106 storing data (5016 of drawing 6). The data stored in the receive buffer is taken out one by one, and data is outputted according to the protocol of the IEEE 1284 interface 2104. Printing data is outputted from the printer 109 by carrying out like this.

[0150] A program notifies ABORT of transmission to the application server 105, when overflow of a receive buffer is checked and overflowed. Even if ABORT of transmission is notified to the application server 105, it may not end transmission of data promptly.

A communication session must be ended after checking the data transmission ABORT response from the application server 105.

[0151] If connection to a print data call forwarding service is completed, the application server 105 will notify the start of a session. If this adapter 108 receives the start of a session, it will acquire the printer status of the printer 109 and will return it to the application server 105. The application server 105 sends print data per 1 job. After receiving the print data for one job, the data transfer of the following job starts by transmitting printer status.

[0152] The end of data is notified that the print job of the application server 105 is lost. If this adapter 108 receives the end of data, it will move to the end mode of communication (5011 of drawing 6), will end connection to a print data call forwarding service, will log out of the application server 105 and will cut a circuit. It moves to printing / buffer flash mode (5012 of drawing 6) after cutting. As long as there are no abnormalities in the printer 109, all the print data in a receive buffer are sent out to the printer 109, an initial signal is sent and it returns to an idle mode (5004 of drawing 6).

[0153] Also, it is the same as even if the reply to print data or control commands goes through the data receiving timeout time stored in the User Information field (drawing 8), when not sent.

[0154] If the pushing of SW(3) 2111 is detected during data receiving, ABORT of transmission will be notified to the application server 105. The adapter 108 returns to the usual receiving mode (5008 of drawing 6) after a notice, It moves to the end mode of communication (5011 of drawing 6) by the data transmission ABORT response from the application server 105 and reception is ended, also, it moves to printing / buffer flash mode (5012 of drawing 6), the contents of the buffer are printed and it returns to an idle mode (5004 of drawing 6).

[0155] If line disconnection is detected, it will move to printing / buffer flash mode (5012 of drawing 6), all the print data in a receive buffer will be sent out to the printer 109, an initial signal will be sent, and it will return to an idle mode (5004 of drawing 6).

[0156] If a printer error is detected during data receiving, it will move to printer error mode (5013 of drawing 6), and ABORT of transmission will be notified to the application server 105. This adapter 108 returns to the usual receiving mode (5008 of drawing 6) after a notice, it moves to the end mode of communication (5011 of drawing 6) by the data transfer ABORT response from the application server 105 and disconnection is carried out, also, it moves to printing / buffer flash mode (5012 of drawing 6), and reception is ended. The application server 105 recognizes that the printer error occurred according to the notice of ABORT from the adapter 108, recognizes the job in which the printer error occurred and it manages it so that the job may not be deleted.

When a printer error is recovered and a user pushes switch SW(2) 2110 of the adapter 108, it moves to the state 5005 of drawing 6, and call origination is carried out to the application server 105. The application server 105 resends the data of a job in which the error occurred according to call origination. The adapter 108 moves to the state 5008 of drawing 6, and receives data from the application server 105.

[0157] This adapter 108 supervises an IEEE 1284PError signal during printing and if it detects an error, it will stop the data forwarding to IEEE 1284. And no paper is carried out, it moves to the mode (5010 of drawing 6), and the sending-out stop of received data is requested to the application server 105 by carrying out ABORT sending out. The adapter 108 receives print data after a stop, and moves only to the mode (5016 of drawing 6) stored in a buffer. At this time, the same buffer overflow check as the usual data receiving mode (5008 of drawing 6) and the pushing check of SW(3) 2111 are performed.

[0158] If the adapter 108 finishes receiving 1-page data, it will move to the end mode of communication (5017 of drawing 6), a connection with a print data call forwarding service is ended, it logs out of the application server 105, a circuit is cut and it waits for a user to do the pushing of SW(2) 2119. If SW (2) 2110 is pushed, it moves to printing / buffer flash mode (5018 of drawing 6) and the data in a receive buffer is sent out to the printer 109 from the beginning of the page. If printing is successful, the flash plate of the receive buffer will be carried out, and it will return to an idle

mode (5004 of drawing 6). If printing goes wrong, it will return to the mode (5017 of drawing 6) that waits for the pushing of SW(2) 2110.

[0159] Drawing 11 is a drawing showing the flow in program update mode.

[0160] Program update mode (5030 of drawing 6) enters by one electric power switch SW1, pushing SW2, SW3 both. In the mode, LED1 and LED2 carry out red blink simultaneously. In this mode, the newest program module currently prepared for the server can be downloaded and the program on a flash ROM can be rewritten.

[0161] The state of SW2 is judged in S7001. If SW2 is pushed by S7001, call origination will be carried out to the registration center number stored in the adapter information field in S7002. Connection with a server is checked by the judgment S7003. Here, connected states including retry time (n) are judged. When connection goes wrong, the red continuous light of LED1 and LED2 is carried out in (i>n and S7004, and CPU is made into a standby mode and it shifts to the state 5002 in which only the power OFF by SW1 is possible.

[0162] On the other hand, if it is connected with a server, the adapter ID stored in the adapter information field in S7005 is logged in without a login ID and Password by PPP. It judges whether it has logged in by the judgment S7006, and including the number of retries (m). When login goes wrong (j>m), a circuit is cut by the processing 7004 and the red continuous light of LED1 and LED2 is carried out, CPU is made into a

standby mode, and it changes into the state in which only the power OFF by SW1 is possible.

[0163] It connects with a FTP server as an adapter ID that is stored in Anonymous in a User name and stored in the adapter information field in Password by the processing S7007. The IP address of the FTP server is stored in the adapter information field. When it is judged as failure to connection by the judgment 7008, PPP connection and a circuit are cut by the processing 7004 and the red continuous light of LED1 and LED2 is carried out, CPU is made into a standby mode, and it changes into the state in which only the power OFF by SW1 is possible.

[0164] When it succeeds in connection, a file «Version.inf» is acquired from a FTP server in S7009.

[0165] When it judges whether it is a success of acquisition of a file «Version.inf» by the judgment S7017 and is judged as failure, PPP connection and a circuit are cut by the processing 7004 and the red continuous light of LED1 and LED2 is carried out, CPU is made into a standby mode and it changes into the state in which only the power OFF by SW1 is possible.

[0166] The following data is written to the file «Version.inf».

[0167] Example Vnnn;program.binprogram.bin shows the program file name. Vnnn shows the latest version number.

[0168] In this example, Vnnn begins from V001, and if a version progresses, it will increase every 1.

[0169] If it judges that this application program compares the version number entered in the head of the program area explained to a latest version number and drawing 12 by the judgment S7010, and needs to be upgraded, the file (program.bin) shown by the mentioned above program file name is acquired in S7011. When a version is equal or when old, a circuit is cut, and it progresses to S7016. When acquisition of a file goes wrong by the judgment S7012, it progresses to the processing S7004 and disconnects from a FTP server, and PPP connection and a circuit are cut, and the red continuous light of LED1 and LED2 is carried out, CPU is made into a standby mode and it changes into the state in which only the power OFF by SW1 is possible.

[0170] After acquiring a file (program.bin), it disconnects from a FTP server by the processing S7013 and PPP connection and a circuit are cut.

[0171] A receiving file size is checked by the judgment S7014. 16bitCRC of the whole program area is added to the received file from a server. The justification of data that performed CRC check and received is checked. If the received data is right, it stores in the program storage area on the flash ROM 2105 by the processing 7015. The execution program at this time is developed by the memory 2106 from the flash ROM 2105 and a program is executed from the memory 2106. The comparison check of the received data and the stored data is carried out.

[0172] On the other hand, when the data received by the judgment S7014 is not right or when a comparison check is not right, it moves to S7004, the red continuous light of LED1 and LED2 is carried out, CPU is made into a standby mode, and it changes into the state in which only the power OFF by SW1 is possible.

[0173] If it succeeds in rewriting, the green continuous light of LED1 and LED2 will be carried out in S7016 and it will be set in the mode that makes CPU a standby mode and can perform only power OFF by SW1.

[0174] The contents of the program storage area are shown on drawing 12 (a). The check sum value with which a value that is set to 0 when all the bytes of the version number entered in the head and a program area are added is dedicated to a program area is provided in the head of this program.

[0175] The contents of the program file are shown on drawing 12 (b). 2 bytes of CRC data is added to the program file (program.bin) transmitted in addition to the data dedicated to the mentioned above program storage area. 2 bytes of CRC data is deleted when copied to a program area and it is performed.

[0176] In the mentioned above embodiment, the program of each processing shown on drawing 9, drawing 10 and drawing 11 is stored by ROM 2105 of the adapter 108 of drawing 4 and is executed with the microcomputer 2102.

[0177] (The 2nd embodiment) next, the 2nd embodiment is described. Since the composition of the 2nd embodiment is fundamentally the same as that of

the 1st embodiment, the composition of the 1st embodiment is used in explanation of the 2nd embodiment.

[0178] Drawing 14 shows the flow chart about program update of the adapter 108 in the 2nd embodiment. About the same step as the call origination processing in the 1st embodiment shown on drawing 11 explained previously, this flow omits explanation while showing a step number by the same number.

[0179] When it succeeds in connection by the processing S7007, a file «Version.inf» is acquired from a FTP server in S8001.

[0180] The following data is written to the file «Version.inf».

[0181] VnnnVnnn shows the latest version number.

[0182] If it judges that upgrade is required after the judgment S8002 compares a version number, the file (romimage.bin) preliminary decided by the program of the adapter 108 will be acquired in S8003.

[0183] On the other hand, FileTransferManager 3220 of the server 105 manages the following files in addition to the mentioned above embodiment

[0184] romimage.bin (update program file for Adapter 3213)

When downloading a program by the difference in a version number by carrying out like this, it can be decided preliminary which program the adapter program itself acquires.

[0185] (Other embodiments) Instead of the composition of each embodiment mentioned above, the following composition is possible.

[0186] That is, the personal digital assistant 102 may be transposed to the stationary type telephone (modem) that communicates with a cable from the device that communicates by the radio represented with PHS or PDC.

[0187] The adapter 108 may be the composition built in the printer 109 (unification).

[0188] It is not limited in order of processing of initialization in the adapter 108, and the processing that specifically showed the connection confirm of the communication terminal 107, the connection confirm of the printer 109 by the embodiment. Although a mail arrival check, button detection, and the like were explained serially, they are not limited in order of the processing shown by the embodiment, and it may be made similarly to judge them in another process by the concept of an event.

[0189] The storage that stored the program code of the software that realizes the function of each embodiment mentioned above, also when a system or a device is supplied and the computer (or CPU and MPU) of the system or a device reads and executes the program code stored in the storage, it cannot be overemphasized that this invention is achieved.

[0190] In this case, the program code itself read from the storage will realize the function of each mentioned above embodiment and the storage that stored that program code will constitute this invention.

[0191] As a storage for supplying a program code, a floppy disk, a hard disk an optical disc, a magneto-optical disc, CD-ROM, CD-R, magnetic tape, a nonvolatile memory card, ROM, and the like can be used, for example.

[0192] By executing the program code that the computer read, based on directions of the program code the function of each embodiment mentioned above is not only realized, also when the function of each embodiment that performed a part or all of processing that OS and the like that are working on a computer are actual, and was mentioned above by the processing is realized, it cannot be overemphasized that it is included in this invention.

[0193] After the program code read from the storage was written in the memory with which the function expansion unit connected to the expansion board inserted in the computer or the computer is equipped, also when the function of each embodiment that performed a part or all of processing that CPU and the like with which the expansion board and function expansion unit are equipped are actual, based on directions of the program code and was mentioned above by the processing is realized, it cannot be overemphasized that it is included in this invention.

[0194]

[Effect of the invention] As explained in full details above, the file preliminary decided with the print control unit with the information about the program of a print control unit is acquired from a server, the information in the acquired file was judged, and after storing in the memory that can rewrite the program that received and received the program from the server by the decision result, it could write in the nonvolatile memory of the print control unit.

[0195] Thus, the automatic program update by user directions is achieved.

[0196] Since the circuit could be cut when the program information to update was the same, it is lost that a telephone rate is charged more than needed.

[0197] Since a circuit is cut when stored in the memory that similarly can rewrite the received program, it is lost that a telephone rate is charged more than needed.

[0198] Since the protocol preexisting (verification of operational stability is made) can be used now, mounting of a server or an adapter can be performed easily and it can be constituted cheaply.

[0199] Since the version information updated by the file decided preliminary and the program name to download could be acquired, it is able to perform easily management of the version information of the program by the side of a server. It became possible to control operation of an adapter by a version file.

[Brief description of the drawings]

[Drawing 1] is a system configuration drawing showing the 1st embodiment of this invention.

[Drawing 2] is a drawing showing the internal configuration of the application server shown by drawing 1.

[Drawing 3] is a software module line-block diagram in an application server.

[Drawing 4] is a block diagram showing the electric constitution of an adapter.

[Drawing 5] is a drawing showing the composition of the software mounted in an adapter.

[Drawing 6] is a drawing showing the change state of an adapter.

[Drawing 7] is a drawing showing the composition of the adapter information field on ROM.

[Drawing 8] is a drawing showing the composition of the User Information field on ROM.

[Drawing 9] is a flow chart that shows the procedure of the processing relevant to initialization of an adapter.

[Drawing 10] is a flow chart that shows the procedure of the processing relevant to the call origination of an adapter.

[Drawing 11] is a flow chart about program update of an adapter.

[Drawing 12] (a) is a drawing showing a program storage area, and (b) is a drawing showing program file composition.

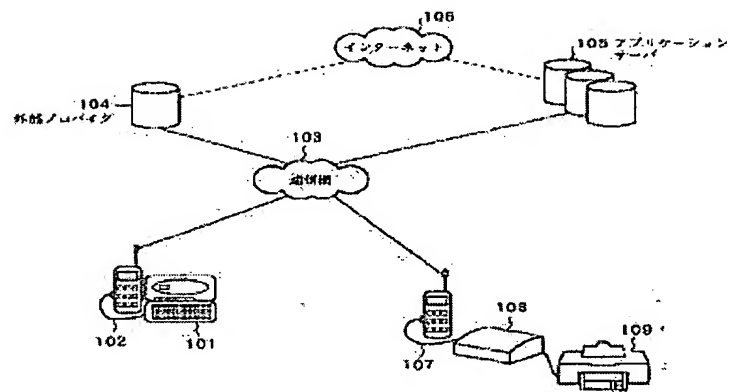
[Drawing 13] is a drawing showing the LED state of an adapter.

[Drawing 14] is a flow chart about the program update in the 2nd embodiment.

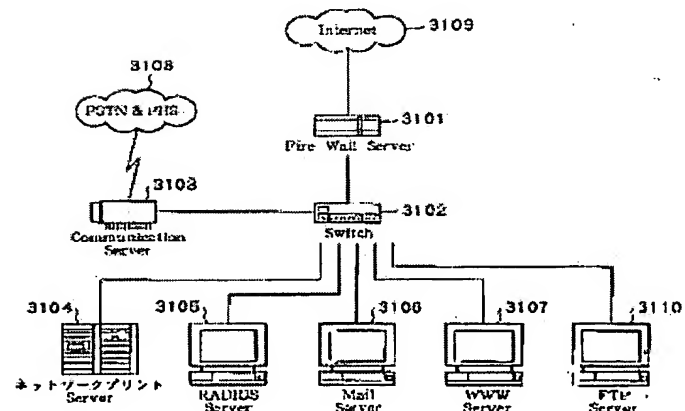
[Description of numerals]

101 PDA
102 Portable communication terminal
103 Communication line network
104 External provider
105 Application server
106 Internet
107 Portable communication terminal
108 Adapter
109 Printer
2101 Communication terminal interface
2102 Microcomputer (CPU)
2103 U/I
2104 Printer interface
2105 ROM
2106 RAM
2107 Power supply
2108 Internal bus
2112 SW(1)
2110 SW(2)
2111 SW(3)
2114 LED(1) 2115 LED(2)

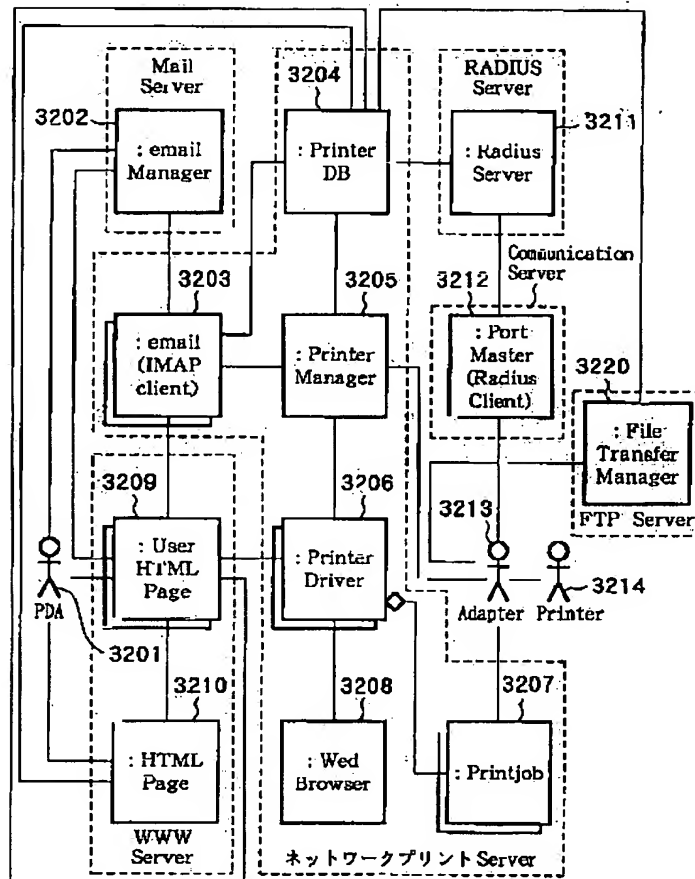
Drawing 1



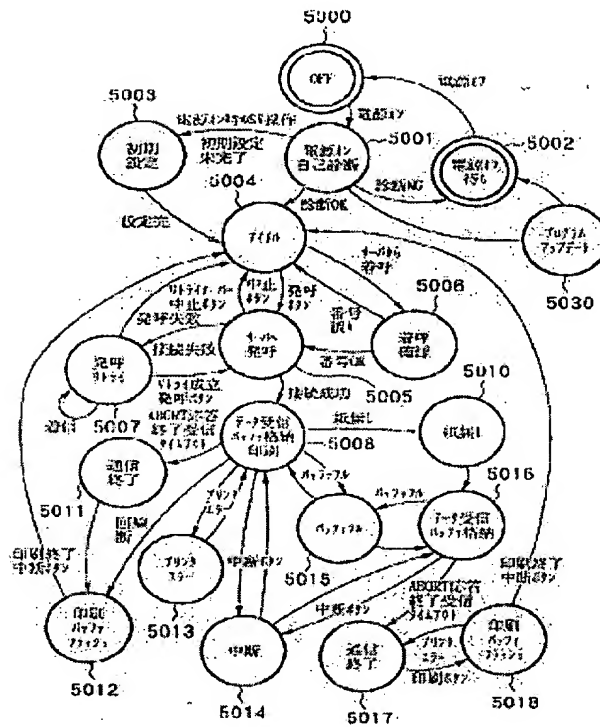
Drawing 2



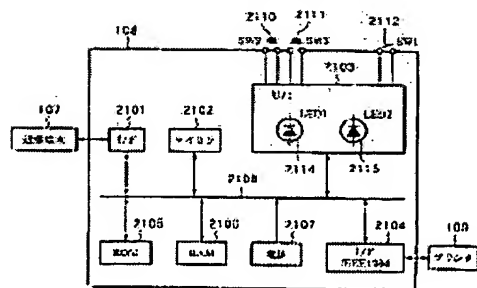
Drawing 3



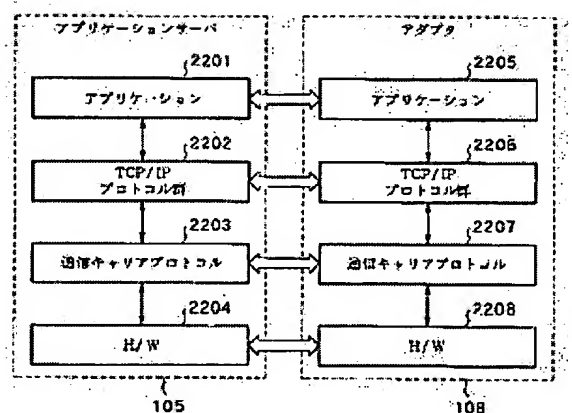
Drawing 6



Drawing 4



Drawing 5

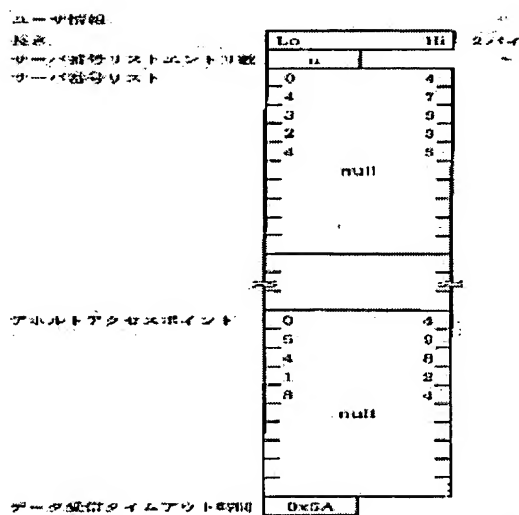


Drawing 7

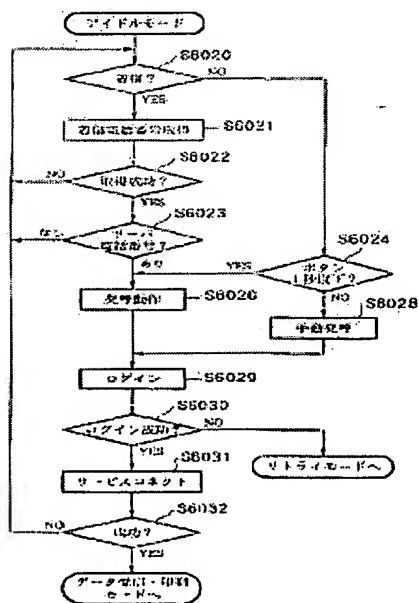
アダプタ情報		
長さ	Lo	Hi
アダプタ ID		2 バイト
	1	2
	3	4
	5	6
	7	8
	9	0
登録パスワード		8 バイト
	P	A
	S	S
	W	W
	R	R
登録センター番号		20 バイト
	0	4
	4	7
	8	9
	1	2
	5	4
	null padding	
TCP サーバ IP アドレス		4 バイト
	102	205
	2	4
スリープ/起死時間 (秒)	0xBA	
アラート ID		1 バイト
	U	F
	D	A
	T	E
	I	D
アラートパスワード		8 バイト
	D	R
	O	W
	S	S
	A	P
チェックサム		1 バイト
	0xXX	

* シンプルの全てのバイトを加算して 0x00 になる値

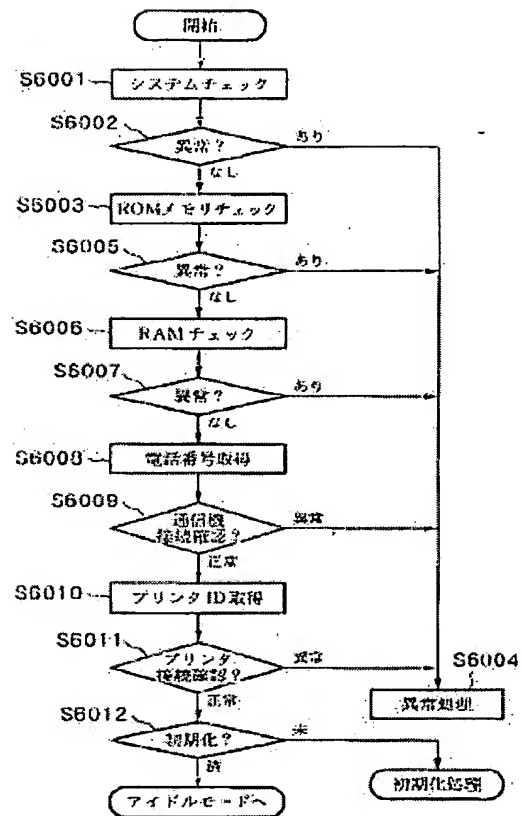
Drawing 8



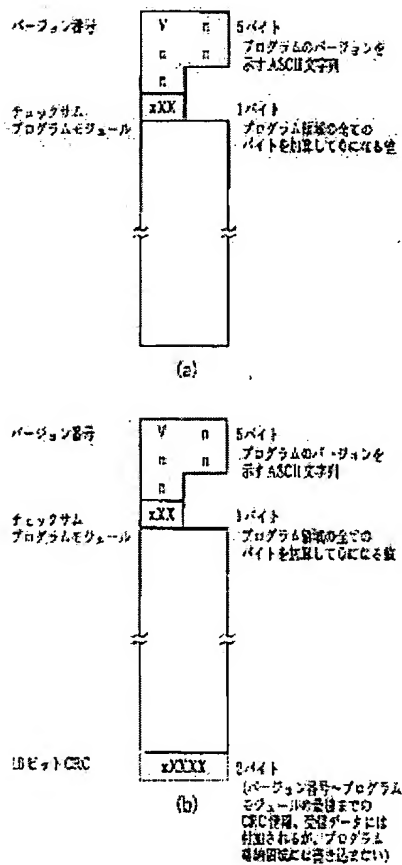
Drawing 10



Drawing 9



Drawing 12

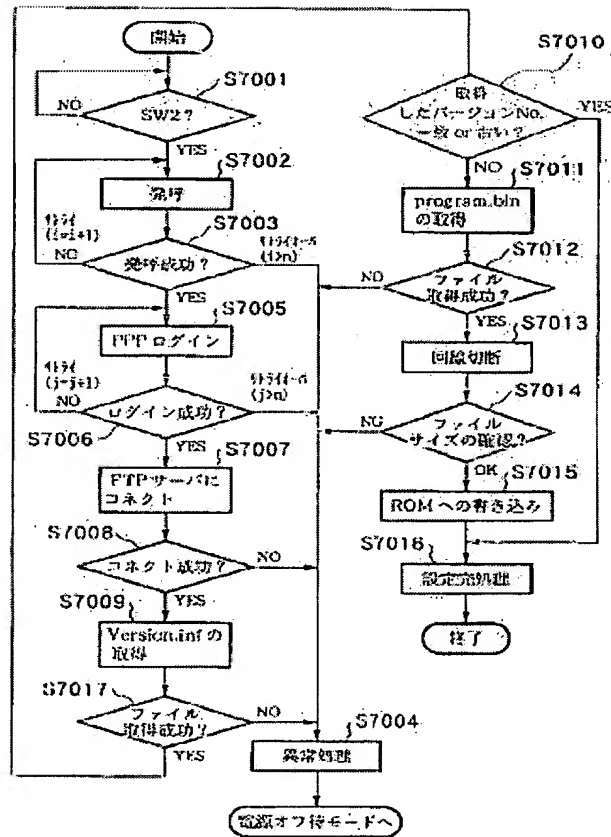


Drawing 13

項目との対応	状態	LED1	LED2
5000	OFF	赤点灯	赤点灯
5001	電源オン自己診断	赤点灯	赤点灯
5002	オフ待ち(自己診断エラー)	赤点灯	赤点灯
5003	監視停止	緑点灯	—
5003	監視復帰	緑点灯	—
5003	監視復帰リトライ	赤点灯	—
5003	監視復帰リトライオーバー	赤点灯	—
5004	スタンバイ	緑点灯	赤点灯
5006	動作確認	緑点灯	—
5006	動作確認	緑点灯	—
5007	動作確認リトライ	赤点灯	—
5008	データ受信、バッファ格納	緑点灯	緑点灯
5008	ステータス送信	—	—
5011	送信終了	緑点灯	—
5011~5012	白電、バッファフラッシュ	—	—
5010	監視し続ける	—	赤点灯
5013	データ受信、バッファ格納	—	赤点灯
5017	送信終了	緑点灯	赤点灯
5018	白電、バッファフラッシュ	—	緑点灯
5015	バッファフル通知	—	緑点灯
5013	プリンタエラー通知	—	赤点灯
5014	中継通知	緑点灯	—
5018~5012	監視停止による印刷	赤点灯	—
5030	プログラムアップデート	赤点灯	赤点灯

—は点灯状態を示さない

Drawing 11



Drawing 14

